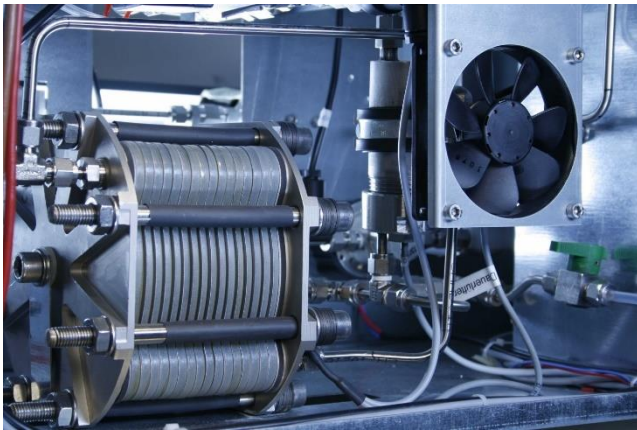


## Fuel Cell Systems

At [Fraunhofer ISE](#) we conduct research on the production, conversion and further thermochemical processing of hydrogen. In the context of the increasing importance of green hydrogen as a fuel, we led the work on the Fraunhofer Hydrogen Roadmap last year and surveyed the potential in our region within the project [“H2-SO – Hydrogen Technologies in the Southern Upper Rhine”](#). With regard to hydrogen production, we are concentrating on polymer-electrolyte membrane electrolysis (PEM). We also apply PEM technology to develop fuel cell systems, particularly for the mobility sector. In the “HyFab” project, we are investigating automated production and quality control processes for the industrial production of fuel cells. Based on thermo-chemical processes, we synthesize liquid fuels and chemicals from hydrogen and carbon dioxide (power-to-liquids). One example is our new miniature plant for [methanol synthesis](#).

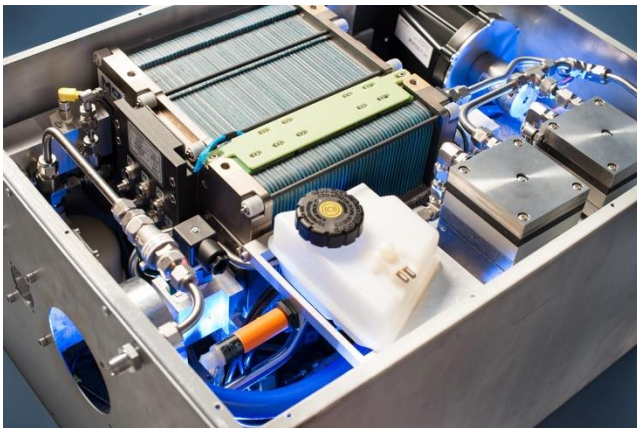
We support the development of membrane fuel cell systems in portable, stationary and mobile applications by characterizing single cells, cell stacks and entire systems. Furthermore, we test peripheral and cell components under extreme climatic conditions and with regard to their electrochemical resistance.

### Development of PEM Water Electrolysis Systems



- Develop laboratory cells for scientific investigations, including reference electrodes on the anode and cathode sides to separately monitor the various overpotentials.
- Develop stack designs for PEM pressure electrolysis up to 50 bar
- Develop and characterize complete PEM electrolysis systems up to ca. 10kW, including customized power electronics and application-specific operation
- Develop customer-specific test rigs for PEM water electrolysis
- Monitor electrolyzers in field tests

### Development of Stacks and Systems



- Validating cell, stack and system design for powers ranging up to 50 kW
- Development of customized fuel cell test stands according to customer specifications
- Development and experimental validation of control strategies, controls and power electronics
- Development of safety techniques for hydrogen technology
- Techno-economic analysis of production processes
- Characterization of Components, Cells and Stacks

*Fraunhofer is one of the world's largest applied R&D organizations, with nearly 80 research units in all sectors of industry, 30000 employees and an annual outlay of Euros 2.9 billion. Of this sum, 2.4 billion euros is generated through contract research. Our global footprint is very strong, with offices and research centers in the Europe, USA and Asia. Some of our renowned innovations are the MP3 format, the white LED, the smallest of cameras. Fraunhofer covers the entire spectrum of energy (Renewables, Storage, E-Mobility, Grid, Hydrogen...) across the value chain from materials to testing and certification. Fraunhofer has been active in India since the past several years, bringing innovative technologies and research competence to India. Fraunhofer in India is the chosen R&D and innovation technology partner of some of the major players in the field of Energy, Environment, Automotive, Electro-mobility, Materials, Production Technology and Smart Cities working with Industry, Government and Public Sector.*

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Kindly get in touch with us if you are interested in this technology or require further information.  
Thanks and Regards,

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